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**Self-inflicted injury among adolescents and young adults –
the role of ethnicity, socioeconomic conditions
and school performance**

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ABSTRACT

Background: Over the past ten years, the number of hospitalisations due to self-inflicted injury has increased significantly among young people in Sweden. The underlying causes are often both psychological and social. Whilst the great deal of research into SII in youth has focused upon psychological factors, the influence of the social ones has been investigated to a lesser extent. The general picture is that females, ethnic minorities, and youth from less favorable socioeconomic background appear to be particularly at risk. Furthermore, increasing empirical evidence is emerging for the important role of school performance.

Aim: The overall aim of this thesis is to investigate the role of ethnicity, socioeconomic conditions and school performance, both at an individual and school level, on the risk of hospitalization due to SII among youth in Sweden. Since these factors, most probably, do not operate in isolation from each other, we aimed to study how they are interrelated in their effects on risk of SII.

Study I aimed to examine socioeconomic factors as confounders of the association between ethnicity and risk of hospital admission due to SII among youth

Study II aimed to examine whether the grade point average when leaving compulsory school predict hospital admission because of SII among youth

Study III aimed to investigate the impact of parental SES on youths' risk of hospital admission because of SII and whether this influence is mediated or/and moderated by a subjects' school performance

Study IV aimed to examine how both individual-level factors and school composition are related to an individual-level risk of SII, as well as to assess interactions effects between individual-level and school composition-level factors (cross-level effects)

Method: All four studies are based on data from the national registers of the Swedish National Board of Health and Welfare and Statistics Sweden comprising information about socioeconomic and health indicators of the entire Swedish population. The study population consisted of the entire Swedish population born between 1973 and 1982 (N=1 009 157) and between 1973 and 1977 (N=491 258) residing in Sweden according to the Swedish Population and Housing Census of 1985 or 1990. The outcome variable—hospital admission at least once due to SII was obtained through individual records linkage to the National Hospital Discharge Register. Information about country of birth of the individuals in the study population and their parents was obtained from the Register of the Total Population. Socioeconomic variables were created by linkage

to: The Swedish Population and Housing Census 1985 and 1990. School performance indicator, grade point average at the time of leaving compulsory school was created by linkage to The National School Register.

Results: Ethnic minorities in Sweden (except those from Southern Europe) had an increased risk of SII as compared with the native population (HRs ranged between 1.6 and 2.3). When socioeconomic conditions were also adjusted for, however, the risks decreased for all ethnic minorities, but remained significantly higher for immigrants from Finland, Western Europe/other Western countries and those in the mixed group. School performance in compulsory school clearly emerged as an important independent predictor of SII [HRs ranged between 1.4 (for GPA=M+1SD) and 6.2 for GPA=(<M-1SD)]. School performance appeared not only as an independent predictor of SII but also as a mediator between parental SES and SII and accounted for as much as 60% of the variance. The risk of SII varied significantly between schools. Individuals who attended schools characterized by a higher proportion of students with low parental SES and single-parent households had a small, but statistically significant excess risk of SII, above and beyond individual background. School-level factors, however, explained less than 1% of student's risk of SII.

Conclusions: The increased risk for SII among youth in non-Western ethnic minorities in Sweden seems to be explained mainly by socioeconomic factors. School performance is an important mediator through which low parental SES translates into risk of SII and poor school performance should be considered as a warning sign for increased risk of SII among young people. School-level factors explain only a small percentage of student's risk of SII, indicating that the differences in SII mainly seem to be due to individual characteristics.

LIST OF PUBLICATIONS

This thesis is based on the following papers, which will be referred to in the text by their Roman numerals:

- I. Jablonska B., Lindberg L., Lindblad F., Hjern A. (2009). Ethnicity, socioeconomic status and self-harm in Swedish youth – a national cohort study. *Psychological Medicine*, 39, 87-94.
- II. Jablonska B., Lindberg L., Lindblad F., Rasmussen F., Östberg V., Hjern A. (2009). School performance and hospital admissions due to self-inflicted injury: a Swedish national cohort study. *International Journal of Epidemiology*, 38, 1334-1341.
- III. Jablonska B., Lindblad F., Östberg V., Lindberg L., Rasmussen F., Hjern A. Parental socioeconomic status and self-inflicted injury – the mediating and moderating role of school performance (manuscript).
- IV. Jablonska B., Östberg V., Hjern A., Lindberg L., Rasmussen F., Modin B. School effect on risk of self-inflicted injury – a multilevel study (manuscript).

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LIST OF ABBREVIATIONS

CI	Confidence Interval
DV	Dependent Variable
GPA	Grade Point Average
HR	Hazard Ratio
ICC	Intra Class Correlation
ICD	International Classification of Diseases
IDB	(EU) Injury Data Base
IV	Independent Variable
M	Mean
MIPEX	Migrant Integration Policy Index
MOR	Median Odds Ratio
OR	Odds Ratio
PCV	Percentage of Change in the Variance
PISA	Programme for International Student Assessment
SD	Standard Deviation
SES	Socioeconomic Status
SII	Self-inflicted Injury
TCSDH	The Commission on Social Determinants of Health
VPC	Variance Partition Coefficient
WHO	World Health Organization

1. Introduction

Self-inflicted injury (SII) is a serious public health problem and the top one leading cause of injury hospitalization among 15-24 year olds in Europe (IDB, 2009). It is associated with considerable risk of subsequent self-injuries and suicide (Hawton et al., 2002). SII has profound negative consequences not only for the subject in question but also for the relatives and for the society as a whole in terms of loss of both human potential and productivity (WHO, 2005).

The underlying causes are often both psychological and social. Whilst the great deal of research into SII in youth has focused upon psychological factors, the influence of the social ones has been investigated to a lesser extent. The growing body of research examining the role of social factors suggests that the phenomenon is not evenly distributed across various social strata. The general picture is that females, ethnic minorities, and youth in less advantageous socioeconomic circumstances appear to be particularly at risk (Schmidtke et al., 2002; van Bergen et al., 2010; Groholt et al., 2000). Furthermore, increasing empirical evidence is emerging for the important role of school performance (Gustafsson et al., 2010).

The overall aim of this thesis is to investigate the role of ethnicity, socioeconomic conditions and school performance on the risk of hospitalization due to SII in youth in Sweden. Since these factors, most probably, do not operate in isolation from each other, we aimed to study how they are interrelated in their effects on risk of SII.

Considerable controversy exists over how to best define nonfatal SII and a variety of terms has been suggested. The rationale behind the choice made for the purpose of this thesis – self-inflicted injury - is provided in the subsequent paragraph.

1.1 Self-inflicted injury (SII)

SII is a broad term used to encompass a spectrum of behaviors that extends from comparatively mild physical injuries (e.g. scratching or pinching skin) to those that, without medical attention, would lead to death. Behaviors at the less severe end of the spectrum are often seen as being used as a coping mechanism in order to provide temporary relief of anxiety, depression or stress and are referred to as non-suicidal in intent.

In this thesis SII was operationalized as *hospital admission, at least once, due to self-inflicted injury*. This suggests that the self-inflicted injuries investigated in this study are injuries at the severe end of this spectrum, often considered and termed as attempted suicide. However, the definition of attempted suicide is complex and varies depending on what dimensions of the act are taken under consideration. The majority of the definitions agree that attempted suicide implies an act committed with at least some intent to die (Reynolds & Mazza, 1994). This stated criterion, however, is often not possible to be directly evaluated in research or is intentionally left out due to complexity of the subject. Durkheim (1951) argued that: *Intent is too intimate a thing to be more than approximately interpreted by another'. It even escapes self-observation. How often we mistake the true reasons for our actions!* (pp.43)

Because an explicit evaluation of intention is complicated, the lethality of the SII method and the medical judgment of the seriousness of the attempt are often perceived as valid indicators of suicidal intent. Otto (1972) found that adolescents who used more violent methods when self-injuring were also at higher risk of committing suicide later in life. Some researchers argue however that these criteria may be less applicable in the context of youth SII since their access to more lethal methods and their awareness of lethality of the chosen method are reduced (Harris & Meyers, 1997).

Not all scholars consider intention to commit suicide as crucial to classify behavior as a suicide attempt and exclude this as a criterion in determining whether an act is or is not suicidal in nature. It has been suggested that *a state of carelessness about one's own life* (Rossow & Lauritzen, 1999) is a common denominator of all self-injuries, with or without conscious suicidal intent.

Despite the relatively high severity of the injuries comprised in this study, the intent behind each act is unknown and the distinction between suicidal and non-suicidal self-injuries cannot be made in a register research of this kind. For this reason we suggest that the use of the term *self-inflicted injury*, which is neutral about suicidal intent, and thus applies to all cases of hospital-treated self-injuries irrespective of the intention, is, in the case of this study, more precise than the use of the term *attempted suicide*. Although there are mixed opinions on whether or not the distinction between suicidal and non-suicidal self-injuries is possible or necessary for the non-fatal cases, *suicide attempt*, by definition - Latin *suicidium*, from *sui caedere*, *to kill oneself* - assumes intentionality to die.

Self-harm is another broad term that includes a variety of behaviors that damage, or cause harm to a person. This broad approach to the definition of SII was

initially an argument for why to use this term in the first study included in this thesis. However, self-harm has sometimes been used as an umbrella term for any type of self-damaging behavior including behaviors, that conventionally do not belong to the taxonomy of SII e.g. eating disorders (Pembroke, 1994). Thus, whereas *attempted suicide* is a too narrow term to be applied to this study, the term *self-harm* is too broad. For this reason we decided to abandon the use of *self-harm* in subsequent studies and to replace it with “SII”.

1.2 Epidemiology

SII has been increasingly identified as an important clinical and public health problem in many countries. SII is one of the most powerful predictors of subsequent self-injuries and suicide (Hawton et al., 2002). Almost 1% of the individuals who attempt suicide die within 1 year (Hawton & Catalan, 1987), and approximately 10% eventually complete a suicide (Gunnell & Frankel, 1994). Poisoning with pharmacological drugs is the most common method of SII (approximately 90% of SII among women and 80% among men) (Runeson et al., 2010).

The prevalence of SII is not distributed evenly among the general population. Age and gender are important demographic markers in the sense that SII is committed most frequently by young people, especially by young women. A WHO multicentre project on SII estimated that the average rates in 12 European cities for youths aged 15 to 24 years were 168 and 283 per 100 000 for males and females, respectively (Schmidtke et al., 1996). However, regional differences in the prevalence of SII are large. In Europe, SII is the most common cause of injury hospitalization among 15-24 year olds, accounting for 23% of all injury hospitalizations, followed by motor vehicle accidents (20%) (IDB, 2009).

SII is strongly associated with gender. The prevalence of SII is higher in women than in men up to the age of 65 when the rates become equal. However, while women are more likely to engage in non-fatal acts, men are more likely to die by suicide (Beautrais 2002, Fergusson et al 2000). Cultural factors related to gender, e.g. social roles, may account for differences in women's and men's SII patterns (Garland & Zigler, 1993). For example, men's engagement in violent acts may serve as an expression of self-injurious tendencies. On the other hand, some authors suggest that because of men's more lethal choices of self-injury methods and consequently

increased probability of receiving medical care, there may be greater a underestimation of the prevalence of SII for women than for men (Canetto, 1997).

Completely accurate and comprehensive statistics for the prevalence of SII are difficult to acquire since many cases are never reported to the healthcare providers (Diekstra & Garnefski, 1995; Morey et al., 2008). Although the true magnitude of self-inflicted injuries is difficult to establish, there are reliable indications that this phenomenon in youth has increased significantly in recent years in several western countries (O'Loughlin & Sherwood, 2005, Prosser, 2007; Nock et al., 2008; National Board of Health and Welfare, 2009).

The two most commonly used methods to estimate prevalence of SII are hospital register data and population surveys. Although registry data provide valuable information about the scope of this problem, they have some notable limitations. Research has demonstrated that the actual prevalence of SII is much higher than the rates recorded in the official statistics. Some findings suggest that the percentage of SII acts that do not make the contact with a public hospital is as high as 75% (Sayer et al., 1996; Kjoller & Helveg-Larsen, 2000).

Population surveys are necessary for assessing the prevalence of SII not registered by the health care system. Community studies in a number of countries have estimated rates of self-inflicted injuries for youth that range from 3% to 12% of the population (Dubow et al., 1989; Andrews and Lewinsohn, 1992; Safer, 1997; Blum et al., 2003; Morey et al., 2008). While population surveys can yield valuable information, they have limitations, one of which is rooted in their reliance on self-reporting. For example, responders may be reluctant to disclosure information about SII or, in the case of retrospective studies, self-reports may be influenced by biased recall.

Sweden

National Register data

Sweden's statistics for hospitalizations following SII show that in 1997 the rate for 15-25 year-olds was 72/100 000 for men and 184/100 000 for women. Since then SII rates in women have risen steeply reaching almost to 350/100 000 in 2007 (Jiang et al., 2009). The female rate has decreased slightly in the last two years (The National Board of Health and Welfare, 2009). In men, the trend was less steep than that for women but the number has grown to 147/100 000 in 2007. Self-injuries among youth are more than twice as common among women as among men.

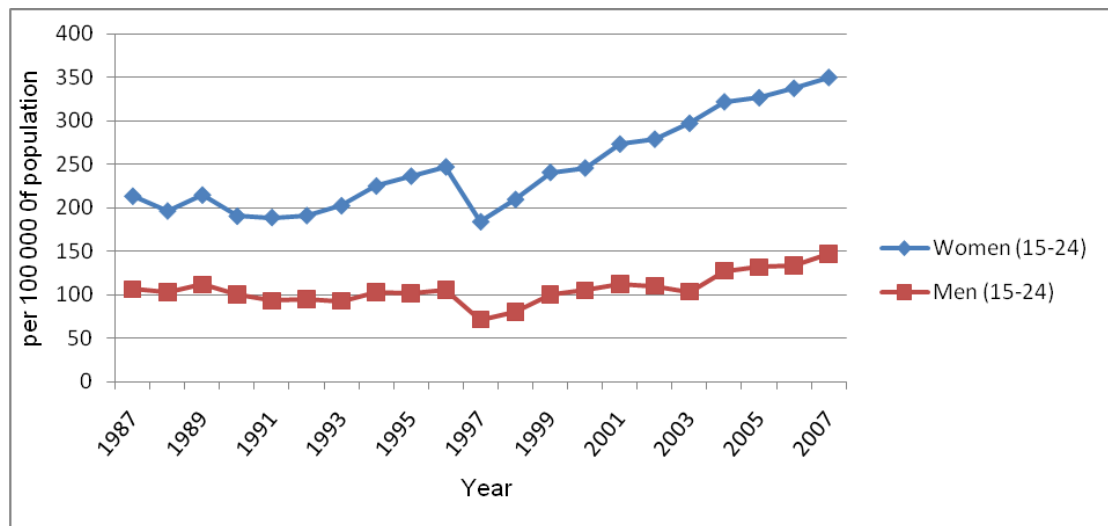


Figure 1. Hospital discharges due to self-inflicted injury per 100 000 of population
Source: The National Patient Register.

Survey data

The National Public Health Institute public health survey in 2007 indicated that 6% of women and 4% of men aged 16-29 had at least once tried to kill her-/himself (Public Health Report, 2007). In an older survey from 1998, 8% of the girls and 3% of the boys in the 16-17 age group reported a lifetime history of suicide attempt. Half of them stated that they had sought medical care afterwards (Olsson, 1998).

1.3 Risk factors

A risk factor increases the probability of an event to occur. An individual possessing or being under the influence of the factor/-s is more likely to experience the outcome than someone selected at random from the general population. Risk factors can operate within the individual, the family, or a higher level context, e.g. school or neighborhood and can be conceptualized under several different headings, such as distal and proximal; non-modifiable and modifiable; individual, family and social.

Traditionally, SII has been viewed as a consequence of psychological and psychiatric risk factors and considered primarily a concern of the mental health care (Nrugham et al., 2010). Recent reviews of SII in young people disclose that the phenomenon is an outcome of the complex interplay between risk and protective neurobiological, genetic, psychological, social, cultural and environmental factors (Beautrais et al., 1996; Beautrais, 2005). As with any other health problem, prevention of SII begins by identifying these features.

The current work is guided by a *social determinants of health perspective* that acknowledges that an individual's health is determined by *the social conditions in which people are born, grow, live, work and age* (WHO, 2009). The importance and frequently ingored role of social conditions on population health and health equity has been stressed in the recent report from The Commission on Social Determinants of Health (TCSDH, 2008). Reducing social inequalities in youth mental health is especially equitable because young people have a very limited control over *the social conditions in which they are born and grow* that are detrimental to their health. The preexisting social conditions shape the health of youth whether they intent to participate in the process or not. This thesis focuses on differences in the risk of SII between youth, based on: ethnicity, socioeconomic status, and school performance. Family affluence along with socioeconomic status as well as school environment have been highlighted as two of the main social contexts for the health of young people (Currie et al., 2008). These factors may intersect with each other and operate at both the individual and aggregate level. Moreover, they also play a crucial role in intergenerational mobility of education and health status (Feinstein et al., 2006).

1.3.1 Ethnicity

Ethnicity is defined as a common heritage shared by a particular group. This would include similarities of history, language, as well as a common set of beliefs and rituals (Zenner, 1996).

Comparisons between countries

National SII rates differ significantly between countries. Since 1989, 16 centers in 13 European cities have been collecting data about suicide attempts. The results of this cross-national study show that in the period 1989–1992 the lowest average age-standardized rate of suicide attempts in both men and women was found in Guipu'zcoa, Spain (45 respective 69 per 100 000) whereas the highest rate was seen in the male population of Helsinki, Finland (314 per 100 000) and the female population of Cergy-Pontoise, France (462 per 100 000) (Schmidtke et al., 1996). For Europe it appears to be a consistent finding that SII rates tend to be lower in the Mediterranean region, with eastern European countries, particularly Finland, Hungary, Slovenia and the Baltic States affected the most (Schmidtke et al. 1996; Chishti et al. 2003; IDB, 2009).

In a cross-national comparison of the rates of suicide attempts in the 1980s, including 9 European and non-European countries (Canada, France, Lebanon, New Zealand, Puerto Rico, Republic of Korea, Taiwan, USA, and West Germany), the lifetime prevalence of suicide attempts varied between 0.7% in Lebanon and 5.9% in Puerto Rico (Weissman et al., 1999). Results from the WHO/SUPRE-MISS multisite survey study indicated that lifetime prevalence of SII varies between 0.4% in Hanoi and 4.2 in Karaj and Brisbane (Bertolote et al. 2005).

Table 1. Lifetime suicide attempts, and medical attention (in %, rounded) following the first suicide attempt (from Bertolote et al., 2005)

	Attempts		Medical attention	
	N	%	N	%
Campinas	516	3.1	16	38
Chennai	500	1.6	8	88
Colombo	675	2.1	9	56
Durban	500	3.4	17	47
Hanoi	2267	0.4	9	22
Karaj	504	4.2	21	48
Tallinn	497	3.6	18	39
Yuncheng	503	2.4	12	75
Brisbane	11553	4.2	No data	
Stockholm	30310	4.0	1221	55

There are several factors that may account for the variation in SII rates between countries, such as differences in economic development, cultural attitudes toward suicidal behaviors (Bertolote et al. 2005), and religious beliefs (Dervic et al., 2004).

Comparisons within countries

Comparisons within countries have shown that in general the rates of mental health problems, including SII are higher in ethnic minorities than in indigenous populations (van Bergen et al., 2010). However, the findings on SII in ethnic minorities are not entirely consistent (Bursztein et al., 2010).

What distinguishes ethnic minorities from the indigenous population is often not only the race and/or a culture but also the history of migration. Ethnic minorities are often composed of groups of people born, or having parents born, outside the country of residence.

In recent years migrant populations have increased considerably in Europe, with Sweden being one of the largest reception countries of immigrants.

Immigrants, defined as being born in another country, comprise a large segment of Sweden's population and in 2008, the total number was 1 281 581, comprising almost 14% of the population (Statistics Sweden, 2010). In response to expanding industry, postwar immigration to Sweden has been dominated by rapidly increasing immigration from European countries. Especially large was the migration from Finland, but significant amounts of migrants also came from other Nordic and European countries. In the 1960s, migration began from a number of countries in the Balkans and what was then Czechoslovakia. After 1970, the Swedish migration changed in character and consisted of refugees from Eastern Europe and from non-European countries.

Speaking about "migrant health" may imply that the process of migration or having an immigrant background influences all immigrants in the similar way. However, neither migrants nor native populations are homogeneous in their characteristics that matter in the encounter between different cultures. What is more plausible is that the mental health of ethnic minorities is, in addition to the process of migration itself, influenced by living conditions and social norms in the origin and the host country (Taloyan et al., 2008). It has been suggested that the greater the cultural distance between these countries, the more challenging is the acculturation (Searle & Ward, 1990).

Migrant populations differ from each other with respect to social and historical baggage brought along. This baggage can be either useful or limiting in the process of integration into a country of resettlement. These populations are also not homogenous in their levels of SES upon arrival in the new country and their patterns of socioeconomic mobility over time. In addition to these characteristics, mental health is also related to cultural beliefs and values related to health and illness. It has been shown for example that suicidal behavior more closely resembles the one of the country of origin rather than the host country (Cantor et al., 1998; Voracek et al., 2009). Also the host countries differ with respect to characteristics relevant for ethnic minorities to acculturate, such as the country's history of migration, the social support provided for the newcomers, and discrimination. For example, a study conducted in 2007 of how Europe integrates immigrants has exposed wide variations in the welcome foreign workers receive. The study measured policies to integrate migrants across 25 EU member states by using such indicators as: immigrants' rights in the workplace, the opportunities for permanent settlement, permission for family to join them, and laws to combat racism and prejudice. Sweden was the top ranked nation for integration in the Migrant Integration Policy Index (MIPEX).

Research on mental health among immigrants has focused predominantly on adult populations (Westman et al., 2006; Blomstedt et al., 2007; Tinghög et al., 2007; Taloyan et al., 2008) and less on the association between immigrant background and mental health in youth (King & Merchant, 2008). However, the pattern of findings suggests that the group of immigrant youth is more at risk of developing mental health problems, including SII, than the dominant youth population (e.g. Ponizowsky et al., 1999; Saraiva Leão, et al., 2005; Burger et al., 2009) and that second-generation immigrants have higher levels of identified psychopathology than their parents (Escobar & Vega, 2000; Hjern & Allebeck, 2002).

1.3.2 Socioeconomic conditions in childhood

The position an individual occupies in the socioeconomic hierarchy has long been recognized as one of the major determinants of his/her health and since the so called *Black report* was published in 1988 (Black, 1988) the evidence of social differences in health is mounting. The higher the socioeconomic position, in terms of education, socioeconomic status (SES) and income, the better the health. This phenomenon seems to be universal across gender, ages, and cultures and is not restricted to physical health but applies also to mental health.

The foundations of mental health originate in childhood. The process of becoming a healthy individual begins at birth, or as some authors have suggested already in utero (Barker, 1995), and continues throughout the subsequent stages of development. Adequate nutrition in fetal and early life, adequate birth weight, a secure attachment to primary caregivers, a proper cognitive development, education and successful transition into the labor market all lay a good foundation for health (Adam et al., 1996; Power & Matthews, 1997). However, not all individuals have an equal chance for a stable foundation to be built and the starting point that significantly impacts its quality is the socioeconomic environment in childhood. The main characteristic that places children in the social stratification system related to health is parental socioeconomic status (parental SES, also referred to as SES of origin). Parental SES is a global construct that captures various dimensions of social, financial and human capital available for the child (Bradley & Corwyn 2002). It is usually constructed and defined as a composite measure of household income, level of education and social status.

It is well recognized, that children with low parental SES suffer from poorer health and are more likely to face a wide range of other adversities than their

more affluent counterparts. A growing number of studies have shown that these effects may also be long lasting (e.g. Dube et al., 2001; Huurre et al., 2003). Some but not all studies (e.g. Marmot et al., 2001) show that the association between the SES of origin and health persists even after adjustment for an individual's own SES in adulthood (Reynolds & Ross, 1998; Harper et al., 2002).

SII among youth has been a particularly neglected outcome of socioeconomic inequalities in the research. Yet, the existing findings indicate that socioeconomic inequalities in risk of SII among youth have been evident in some countries, including Sweden, (Toros et al., 2004; Groholt et al., 2000; Mittendorfer-Rutz et al. 2004) and not in others (Tomori et al., 2001; Christoffersen et al. 2003).

Some authors suggest that socioeconomic inequalities in health are less evident for youth than for other age groups and that youth is a period of equalization of health (West, 1997). On the other hand, the lack of direct effect of SES of origin on health may not necessarily imply that there is no association between the both phenomena. It is plausible that the effects of social origins on health are mediated by factors closely related to parental SES, e.g. type of educational program (Hagquist 2006) or social status among peers (Modin et al., in press), rather than being non-existent. In addition, it appears that the equalization of health is not universal but differs depending on the health outcome in question (West, 1997).

1.3.3 School performance

Next to home, adolescents spend more time at school than anywhere else. The primary responsibility of school is to provide students with an education that will allow them the opportunity to be successful in life. By doing so, school plays a key role in the process of shaping current and future health of their students. Satisfactory school performance has long-term implications for the individual and for the society as a whole. Crimmins and Saito (2001) have found that the difference in healthy life expectancy (i.e. the measure considering the quantitative as well as qualitative aspects of health) between a 30-year old white man with 9 years of education and a comparison with a graduate one from high school is on average 10 years to the disadvantage of the former. Several studies with an experimental design have shown that educational interventions may improve health (Silles, 2009, Spasojevic, 2003).

Although education has long been recognized as a key factor placing people at different risk of ill-health (Feinstein et al., 2006) less attention has been paid to the role of school performance in mental health, especially SII risk. The more

common view has been to consider school performance as an outcome of mental health rather than as an exposure (Gustafsson et al., 2010). However, recent findings emphasize that cognitive development, school performance and mental health are closely intertwined (Gustafsson et al., 2010). There is emerging evidence that poor academic performance is predictive of poor mental health (Richardson et al., 2005; Gustafsson et al., 2010). In few studies, however, school performance has been measured directly using school grades but rather assessed by indirect measures such as truancy, school drop-out, or self-reported grades (e.g. Richardson et al., 2005).

1.4 Intersections and pathways

Research on the social determinants of health has increasingly recognized that the examination of a single risk factor does not address the nature and complexity of processes that contribute to the social disparities in mental health, since risk factors intersect with each other, overlap, and mediate the effect of other variables or are mediated through more immediate ones.

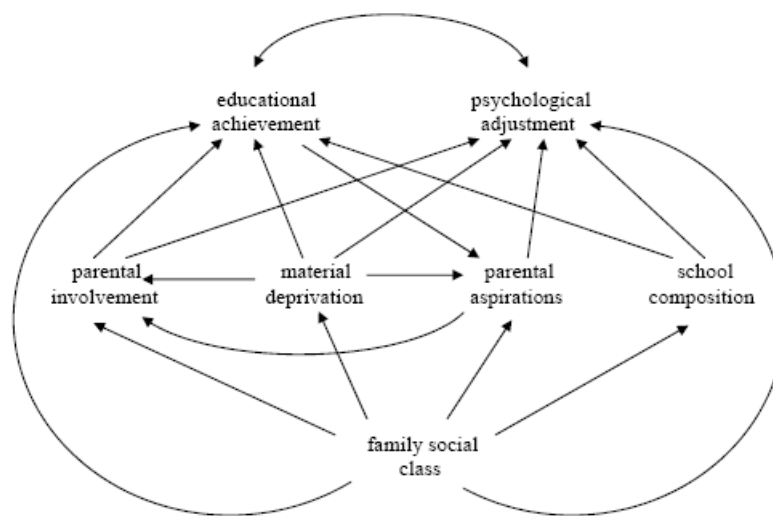


Figure2. Sacker et al (2002) model of the relationship between family social class, educational achievement and psychological adjustment

1.4.1 Ethnicity and socioeconomic factors

The stress-inducing process of migration and integration with the host culture has often been proposed as an important reason for the higher incidence of mental problems among immigrant youth. However, studies focusing on the role of acculturation on immigrant health have been criticized for often neglecting the fact that many minority groups disproportionately belong to lower socioeconomic strata, a factor

that may be crucial for understanding ethnic differences in health. Hunt and colleagues (2004) after having reviewed a research on Hispanic immigrants in USA have concluded that: *In the absence of a clear definition and an appropriate historical and socio-economic context, the concept of acculturation has come to function as an ideologically convenient black box, wherein problems of unequal access to health posed by more material barriers, such as insurance, transportation, education, and language, are pushed from the foreground, and ethnic culture is made culpable for health inequalities.* (pp.982)

In Sweden, poverty in both absolute and relative terms is faced more often by ethnic minorities, but great variation within the group exists (The National Board of Health and Welfare, 2010). The overall rate of relative poverty¹, 8.2% between 1993 - 2007, masks great variation. While 6.1% of native Swedes were poor, the rate was 16.9% among individuals with an immigrant background. As a result, experiences of economic strain, low SES of origin, and living in disadvantaged neighborhoods are more often faced by immigrant youth than by their native counterparts (Franze'n, 2003; Ministry of Health and Social Affairs, 2004; Salonen, 2004).

However, although social inequalities have been previously suggested to underlie differences in health across ethnic groups (Hjern, 2004; Syed et al. 2006; Tinghög et al. 2007), there are only a very limited number of studies addressing the issue of parental SES as a possible explanation for SII in immigrant youth. In addition, the majority of the available studies is based on small sample sizes, view ethnicity as a dichotomy or are limited to only one ethnic group. Few studies have taken a population based and prospective design.

1.4.2 Pathways between SES of origin and SII

Children are born into a socioeconomic context with pre-existing resources that to a large extent determine their development. While it is recognized that SES affects health throughout the life cycle, the question remains as to what mechanisms might explain this relationship.

A life-course approach to health proposes that social disadvantage may exert an effect on health directly (latency model), indirectly through mediating factors

¹ living in households where the equivalised income is below the threshold of 60% of the national equivalised median income

(pathway model) and/or cumulatively through accumulation of adverse factors whose effects on health combine (cumulative model) (Kuh & Ben-Shlomo 2004). The latency model emphasizes that, independent of subsequent circumstances, early experiences of socioeconomic position will have an effect on health later in life. According to the pathway model socioeconomic disadvantage exerts an effect on health through its impact on the resources children need for healthy growth and development. Such resources could include parental health and parenting practices both found to influence a child's health. In contrast to the latency model, the pathway model takes into account that, under favorable circumstances, the negative development can be successfully outweighed and redirected. However, it is assumed that the latent effects, pathway effects and cumulative disadvantage combine to influence health (Hertzman 1999).

On the assumption that the links between socioeconomic disadvantage in childhood and later risk of SII are causal, the one route through which this association may occur is school performance. The assertion that school performance may serve as a path between parental SES and SII is based on a large body of indirect research connecting SES to academic achievements on the one hand (Bradley & Corwyn, 2002; OECD, 2010a), and an emerging body of evidence connecting school performance with SII on the other hand (Gustafsson et al., 2010). However, although school performance is frequently mentioned as a possible pathway linking SES with health, very few studies have examined this hypothesis explicitly.

School is, second to the family, the most important environment where the cognitive, social and emotional development of the child occurs. The course of this development does, however, as well as do educational progress and pathway, depend heavily on the SES of one's parents' (Jonsson, 2001; Richards & Wadsworth, 2004; Sirin, 2005). It has been a consistent finding that children from socially vulnerable families perform worse at school than their wealthier classmates.

In Sweden and other welfare states, notwithstanding the efforts of educational policy to provide equal opportunities for all children, children with low SES of origin do worse at school and achieve lower levels of education as adults than their more affluent peers (Lipman et al., 1994; Bradley & Corwyn, 2002; OECD, 2010a). This is, perhaps, due to the fact that parental SES also reflects, in addition to material wealth, a wide range of other resources that enhance academic success, e.g. cultural capital, and these are not easy to redistribute by political means.

It is also possible that school performance may modify the relationship between parental SES and SII. This would mean that, as the school performance decreases, the risk of SII increases to a varying degree for different SES groups. For example, children with low SES of origin may be more susceptible to the deleterious effects of poor school performance than high-SES children due to an accumulation of risk factors. On the other hand, there is some reason to believe that poor school performance may, in fact, impose a greater burden on children with high than low SES of origin, with the consequence of putting the former rather than the latter group at risk of SII. According to the status attainment model (Schoon, 2008), educational expectations of parents and their children are directly influenced by parents' SES. Accordingly, high SES parents and their children tend to have higher educational expectations than their low SES comparisons (Garg et al., 2002). Although high educational expectations, in general, result in positive outcomes, this may not be the case when children fail to meet the expected performance level.

1.5 Contextual influences

Most research on SII in youth has focused on risk and protective factors at the level of the individual and the family, but there is increasing recognition that these factors may also operate within the broader social contexts of schools and communities. Studying the characteristics of the broader social context where young people develop would likely contribute to a better understanding of health disparities. It has been long emphasized that individual-level health is not only a result of individual prerequisites but it is also partly shaped by the wider social environment.

Despite the increasing interest in the contextual aspects of health, surprisingly little is known about whether differences in social environments, of which school is a significant part, contribute to disparities in mental health among young people. Educational research has a long tradition of investigating the relationship between the school environment and the students' academic achievements and work career, but it is only recently that the influence of school characteristics on the health and well-being of youth has begun to gain attention.

Existing studies indicate that some part of variation in children's health relates to differences between schools and two hypotheses have been offered: the compositional and the contextual hypothesis. According to the compositional hypothesis, differences in mental health between schools reflect their difference in the make-up of the student body. Consequently, a school containing a higher percentage of

students “at risk” is characterized by higher rates of mental health problems. The contextual hypothesis, on the other hand, posits that school has an effect on health above and beyond that expected, due to the characteristics of the student body.

Different theoretical models have been put forward to explain contextual influences on health:

- *contagion model* predicts that problem behaviors spread through peer influence. Consequently, problems behaviors may be more widespread within the contexts where the behaviors are commonly prevalent.
- *collective socialization model* stresses the role of adults in modeling behavior
- *social comparison* proposes that people judge and evaluate themselves by comparisons with other people

In their review of multilevel studies of school effect on youth, Sellström and Bremberg (2006) concluded that school effects on student`s health outcomes, in addition to individual risk factors, are evident. However, only three of the 17 reviewed studies focused on mental health (Konu et al., 2002; Roeger et al, 2001, van den Oord & Rispens, 1999) and the number of such studies has not increased greatly since then.

There has been very little research aimed at uncovering the mechanisms associated with contextual effects of school on mental health. A review of research suggests that features such as school climate, relationships between students and teachers, and bullying are related to student well-being (Sellström & Bremberg, 2006). Furthermore, schools characterized by a high percentage of low SES and immigrant students show significantly higher rates of mental health problems (Goodman et al., 2003; Gutman & Feinstein, 2008). We are aware of only two studies that have investigated the role of school average performance as a potential contextual risk factor for mental health (Karvonen et al., 2005; Saab & Klinger, 2010). Both studies have reported a negative association between school average performance and mental health.

Contextual factors may operate independently of individual factors or interact with these. For example, poor performers may benefit in terms of mental health from attending schools with better performing students, or as suggested by theory of “social comparison” (Festinger, 1954), they may experience greater levels of stress and lower academic self-concept when facing with competition from high-achieving peers.

2. Aims

General aim

The main aim of the thesis is to increase knowledge about the role of ethnic background, socioeconomic conditions and school performance on self-inflicted injury among adolescents and young adults.

Specific aims

Study I - to examine socioeconomic factors as confounders of the association between ethnicity and risk of hospital admission due to SII among youth

Study II – to examine whether the grade point average when leaving compulsory school predict hospital admission due to SII among youth

Study III - to investigate the impact of parental SES on youths' risk of hospital admission because of SII and whether this influence is mediated or/and moderated by a subjects' school performance

Study IV – to examine how both individual-level factors and school composition are related to an individual-level risk of SII, as well as to assess interactions effects between individual-level and school composition-level factors (cross-level effects)

3. Methods

3.1. Design

All studies are exclusively based on data from the national registers of the Swedish National Board of Health and Welfare and Statistics Sweden comprising information about socioeconomic and health indicators of the entire Swedish population. In the registers residents can be tracked from birth to death by a unique personal identification number. Table 2 provides an overview of the four studies.

Table 2. An overview of the four studies

	Study I	Study II	Study III	Study IV
Data source	National Hospital Discharge Register, Register of the Total Population in 1990, Swedish Population and Housing Census 1990, Total Enumeration Income Survey for 1990	National Hospital Discharge Register, Swedish Population and Housing Census of 1985, The National School Register, Swedish Educational Register	National Hospital Discharge Register, Swedish Population and Housing Census of 1985, The National School Register	National Hospital Discharge Register, Swedish Population and Housing Census of 1985, The National School Register, Swedish Educational Register
Outcome	Hospital admission due to SII	Hospital admission due to SII	Hospital admission due to SII	Hospital admission due to SII
Nr of cases	13 396	5 827	5 827	5 827
Study design	Follow-up	Follow-up	Follow-up	Follow-up
Cohort	1973-82	1973-77	1973-77	1973-77
Measure of risk	Hazard Ratio	Hazard Ratio	Hazard Ratio	Odds Ratio
Statistical model	Cox proportional hazard model	Cox proportional hazard model	Cox proportional hazard model	Multilevel models
Follow-up	1991-2002	1987-2001	1987-2001	1987-2001
Population size	1 009 157	491 258	491 258	491 258

3.2. Cohorts

Study I

The study population consisted of the entire Swedish population born between 1973 and 1982 (N=1009 157) residing in Sweden in November 1990 according to the

Swedish Population and Housing Census of 1990. The cohort was followed in the National Hospital Discharge Register from 1991 to 2002.

Exclusion criteria

International adoptees (n=1711) were excluded from the study because they, although in one sense being immigrants, have a different background and favored socioeconomic prerequisites (Hjern et al., 2002). To minimize the problem of a numerator–denominator bias because of unrecorded migration in foreign-born residents (Weitof et al., 1999), we excluded years of individuals with no income from work or social welfare in the household from the total time in the study.

Study II, III, IV

The study population consisted of the Swedish population born between 1973 and 1977 (N=491 258), registered as residents in the Swedish Population and Housing Census of 1985. These are the first five birth cohorts in the National School Register, the Swedish national data source for information about school performance. Individuals were followed in the National Hospital Discharge Register from the time of graduation and were censored at the date of death from the National Cause of Death Register, date of emigration from the Register of the Total Population or end of follow-up.

Exclusions criteria

Individuals who had been admitted to a hospital due to psychiatric disorder and/or SII before finishing ninth grade (n=1628) were excluded. Their grade point average was 2.84 (SD=0.68) which was similar to those who had been admitted after compulsory school, 2.87 (SD=0.73). Individuals who had three or more incomplete courses (n=7252) were also excluded because of their unreliable grade point average, as were foreign-born children (n=34499) because of the negative influence of migration on school performance (The Swedish National Agency for Education, 2009). In total, 447 929 persons comprised the study population.

3.3. Outcome variable

The outcome variable—hospital admission at least once due to ‘purposely self-inflicted poisoning or injury/suicide (attempted)’ [tenth revision of the International Classification of Diseases (ICD-10)] – was obtained through individual records linkage to the National Hospital Discharge Register from 1991 to 2002 (study I) and 1987 to 2001 (study II, III, IV). The Hospital Discharge Register contains information on all

hospitalized patients in Sweden. It was initiated in 1964 in Uppsala and was gradually extended to cover the whole Sweden.

SII was defined according to the ninth and the tenth revisions of the WHO International Classification of Diseases. To avoid an under-estimation of self-inflicted injuries both intentional and undetermined cases were included. Classification codes for intentional SII/event of undetermined intent contain injuries resulting from: self-poisoning, hanging, strangulation, suffocation, drowning, submersion, discharge of gun/firearms, explosive material, smoke, fire/flames steam, hot vapors/hot objects, sharp/blunt object, jumping from a high place, jumping/lying before moving object, crashing of motor vehicle, other specified and unspecified means.

3.4. Explanatory variables

Ethnic background. Information about country of birth of the individuals in the study population and their parents, obtained from the Register of the Total Population in 1990 and 1985, was used as to create proxies for ethnicity. Register of the Total Population covers all persons registered as residing in Sweden. Asylum-seekers waiting for a residence permit are excluded. When a person emigrates or dies this should be recorded in the register.

Following categories were created:

Majority. The study subject and both his/her parents were born in Sweden.

Minority. No parent born in Sweden - for the purpose of Study I the subcategory *Minority* was further divided into: Finnish, Southern European, Eastern European, Middle Eastern/North African, African (south of Sahara) Central Asian/Far Eastern and Latin American. A Western category was added which included Western Europe, North America, Australia and New Zealand

Mixed. One parent born in Sweden and one parent born in another country.

Socioeconomic variables. Socioeconomic variables were created by linkage to:

The Swedish Population and Housing Census 1985 and 1990: year of birth, gender, socioeconomic status (SES) of the household, single parent household, housing, and geographical location of the home (residency). The register contains data on the total population of Sweden between 1960 and 1990 The Population and Housing Census of 1990 had a nonparticipation rate of 2.5%.

SES was defined according to the classification used by Statistics Sweden which is based on occupation but also takes educational level of occupation, type of production

and position of work of the head of the household into account. Six categories of SES were created: unskilled workers, skilled workers, lower level non-manuals, middle level non-manuals, higher level non-manuals, and others (i.e. self-employed, farmers, students, housewives, old age/sickness disability pensioners, long-term unemployed). The highly heterogeneous composition of the SES category *other* was due to relatively small numbers of individuals belonging to each subcategory.

The Total Enumeration Income Survey for 1990: social welfare benefit received by the head of the household.

The Swedish Educational Register (if available from the register of 2001 and otherwise from the registers of 1995 or 1990): maternal education categorized as Short (≤ 11 years), Medium (12-13 years), Long (14-15 years) and Very Long (16+).

School region was categorized into three groups according to the degree of urbanization: big city area (Stockholm, Gothenburg, Malmö), smaller town, and rural area.

School performance variables. School performance indicator, grade point average at the time of leaving compulsory school was created by linkage to The National School Register which is administered jointly by The Swedish National Agency for Education and Statistics Sweden. This register encompasses such information from all public schools since 1988 and also from all non-public schools, (less than 5% of all Swedish schools) since 1993.

Until 1996 a five-graded relative scale was used in the Swedish school system, supervised by the Swedish School Authority through national tests in core subjects. The quality of the data in the National School Register is high and summary statistics are published regularly (www.skolverket.se).

Grade point average for the sample ranged from a minimum of 1.0 to a maximum of 5.0, $M = 3.2$, $SD = 0.7$. This variation was used to create a four-category variable used in Study II: high ($> M + 1SD$), high average (from M to $+1SD$), low average (from $-1SD$ to $< M$), and low ($< M - 1SD$). For the purpose of the Study II grades in specific subjects in five categories were investigated: (1) Swedish; (2) Natural science subjects - Biology/Physics/Chemistry/Technology (average); (3) Social science subjects - Geography/History/Civics (average); (4) Art related subjects - Arts/Textiles/Wood- and metalwork/Music (average); and (5) Sports. The same procedure for categorization for

the overall grade point average was applied for grades in specific subjects as, using subject-specific mean and SD values.

Contextual variables. Individual and contextual data were linked via a school code obtained from The National School Register which is administered jointly by The Swedish National Agency for Education and Statistics Sweden. School-level variables were constructed by aggregating data from the student-level to the school level.

School-level factors included in this thesis were percentage of: girls, students with a foreign background, students with low parental SES, students living with a single parent, and students having a mother with low education. Individual-level grade point averages were aggregated so that each student was attributed the grade point average at their respective school.

3.5 Statistical methods

Study I and II

Multivariate analyses were performed by Cox proportional hazards regression of time to event with *hospital admission at least once because of SII* as the outcome variable. Time in the studies was calculated with the entry date defined as the starting date, which was January, 1991 (Study I) and the date of graduation (Study II) and the exit date as the date of the first hospital admission, date of death (from the National Cause of Death Register) and date of emigration (from the Total Enumeration Income Survey) or end of follow-up. Year of birth was considered as a continuous variable in the regression models in accordance with the linear relationship of this variable with the outcome. Other variables were entered as categorical variables into the models, when necessary with the use of dummy variables. SPSS version 14.0 (SPSS Inc., Chicago, IL, USA) was used in all statistical analyses.

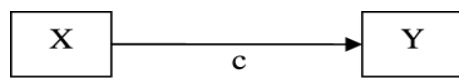
Study III

Multivariate analyses were performed by Cox proportional hazards regression of time to event with *hospital admission at least once because of SII* as the outcome variable. Time in the study was calculated with the entry date defined as the date of graduation and the exit date as the date of the first hospital admission, date of death from the National Cause of Death Register, date of emigration from the Register of the Total Population or end of follow-up (December 2001).

Mediation & Moderation

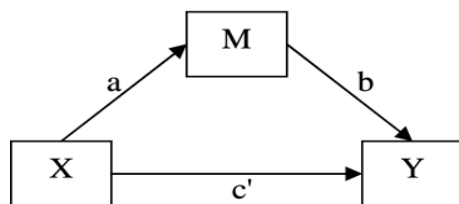
The mediating and moderating role of school performance in the association between parental SES and SII was tested according to recommendations of Baron and Kenny (1986).

The mediation approach is useful for conceptualizing the relation among three or more variables as a way to explain the nature of the relation (Baron & Kenny, 1986). The mediator is *any factor that represents a step in the causal chain between the exposure and outcome (that) should not be treated as an extraneous confounding factor, but instead requires special treatment* (Rothman & Greenland 1998, pp.131). The criteria required for mediation to occur were as follows: 1) parental SES predicts school performance; 2) school performance predicts SII; 3) parental SES predicts SII; 4) the relationship between parental SES and SII is attenuated to non-significance but not absolute zero (in the case of partial mediation) or abolished (in the case of total mediation), when controlling for school performance. Linear regression with dummy variables was used to test whether the first criterion was satisfied and Cox regression of proportional hazards was used to verify satisfaction of all other criteria.



$$Y = i_1 + cX + e_1$$

(a)



$$M = i_2 + aX + e_2$$
$$Y = i_3 + c'X + bM + e_3$$

(b)

Figure 3. Baron and Kenny's (1986) mediation test

- a) Direct effect of the independent variable on the dependent variable
- b) Indirect effect of the independent variable on the dependent variable

Since Baron and Kenny's (1986) mediation tests give a rather holistic assessment of presence of mediation Sobel test was used to assess the statistical reliability of the

degree of mediation (Baron and Kenny, 1986; Herr, 2009). The amount of explained variance accounted for by the mediation was also calculated as:

$$z_{ab} = \frac{a * b}{se_{ab}}$$

where:

a = raw (unstandardized) regression coefficient for association between IV and mediator

se_a = standard error of a

b = raw coefficient for the association between the mediator and the DV (when the IV is also a predictor of the DV)

se_b = standard error of b .

The interaction term between parental SES and grade point average was formed by multiplying dummy coded parental SES by grade point average. Cox proportional hazards regression of time to event was performed using parental SES, grade point average and the interaction term between parental SES and grade point average. To reduce potential problems with multicollinearity in the analysis of moderating effect, school performance was mean-centered by subtracting its sample mean from all individuals' values, thus producing revised sample mean of zero (Aiken & West, 2001). All models were simultaneously adjusted for potential confounding factors (year of birth, gender, ethnicity, and residency). Year of birth was entered as a continuous variable into the regression models in accordance with the linear relation of this variable to the outcome. Other variables were entered as categorical variables into the models, and when necessary with the use of dummy variables. The SPSS software package, version 17.0 was used in all statistical analyses.

Study VI

Two-level logistic regression models (random intercept) with students at level one and schools at level two were used, and computations were carried out using MLwiN 2.10 with Binominal, Penalized Quasi-Likelihood (PQL) procedures (Rasbash et al., 2004). Random intercepts models provide estimates of the *fixed effects* of the predictor variables (i.e. the effects of explanatory variables are assumed to be constant across schools upon the outcome variable).

The first step of the analyses was to run a so-called empty model to obtain the unexplained variance in SII between schools. The variance partition coefficient (VPC) to estimate the proportion of total variance in the outcome attributable to the school level and percentage change in variance (PCV) were calculated. The percentage of PCV is the percentage of the variance in the initial model that is explained when including more variables in an extended model:

$$PCV = ((V_{Model1} - V_{Model2}) / (V_{Model1})) \times 100$$

Contextual effects were also measured by the Median Odds Ratio (MOR) which unlike VPC is not dependent of the prevalence of the outcome (Larsen & Merlo, 2005). In this study, MOR estimates the individual risk of SII (in median) that can be attributed to the school context. MOR equal to one indicates no school variance. The higher the MOR, the more important are the school effects for understanding the individual probability of risk of SII. The first model included all the individual-level characteristics, and in the second model school-level variables were also added to the model, enabling us to assess the effects of school-level characteristics after the influence of individual-level characteristics had been accounted for. The MOR was calculated as:

$$\text{Exp} [0.95(\sqrt{V_{\text{school}}})]$$

where V_{school} = variance between schools

4. Ethical considerations

The study was approved by the regional ethical review board at Karolinska Institutet, Stockholm, Sweden, Dnr 2006/5:8 dated 2006-09-20 (Study I) and Dnr 2007/2:3, dated 2007-03-14 (Study II, III, IV). The data set did not contain any identifiable data like person numbers and it is not possible to detect any individuals in the presentations.

5. Results

5.1 Study I

The cumulated incidence of hospital admission because of SII at least once during 1991–2002 was 0.8% for men and 1.8% for women in the entire cohort. The incidence of hospital admission because of SII was highest among men from Finland (1.9%) and among women from the mixed group Central Asia/Sweden (4.0%) (Table 3).

Table 3. Crude rates of hospital admission related to SII by ethnicity

	N	Cases	Men (%)	Women (%)
<i>Swedish Majority</i>	817 360	9 586	0.7	1.6
<i>Minority</i>				
Finland	25 250	643	1.9	3.2
Western	8 369	141	1.1	2.3
Southern Europe	12 149	147	0.9	1.6
Eastern Europe	10 368	188	1.3	2.4
Middle East + North Africa	22 239	496	1.1	3.5
Africa south of the Sahara	2 721	60	1.7	2.8
Central Asian	4 625	79	0.6	2.8
Latin America	8 586	188	1.5	3.0
<i>Mixed</i>				
Finland/Sweden	33 814	655	1.3	2.6
Western /Sweden	33 523	586	1.2	2.4
Southern Europe/Sweden	9 941	203	1.3	2.7
Eastern Europe/Sweden	9 032	176	1.0	2.9
Middle East + North Africa/Sweden	4 214	83	0.9	3.1
Africa south of the Sahara/Sweden	1 662	40	1.7	3.1
Central Asian/Sweden	2 720	72	1.4	4.0
Latin America/Sweden	2 584	53	1.6	2.5
<i>Total</i>	1 009 157	13 396	0.8	1.8

Cox regression model of ethnicity and hospital admission due to SII, adjusted for year of birth and gender only, revealed that individuals from ethnic minorities (except the Southern Europeans) had higher hazard ratios (HRs) of SII than the Swedish majority (HR 1.5–2.3). In the second model, where possible socioeconomic confounders were introduced, the HRs decreased for all ethnic minorities, but remained significantly higher for immigrants from Finland, Western Europe/other Western countries and those in the mixed group. The immigrants from Southern Europe had significantly lower HRs than the Swedish majority (Table 4).

Table 4. Cox regression models of ethnicity, socioeconomic factors and hospital admission due to SII as the outcome variable

	Model I HR (95%CI)		Model II HR (95%CI)	
Gender				
Male	reference		reference	
Female	2.2	2.1-2.3	2.2	2.1-2.3
Ethnicity				
Swedish Majority	reference		reference	
Minority				
Finland	2.3	2.1-2.5	1.7	1.6-1.9
Western	1.8	1.5-2.1	1.4	1.2-1.7
Southern Europe	1.1	0.9-1.3	0.8	0.7-0.9
Eastern Europe	1.6	1.4-1.9	1.1	1.0-1.3
Non-European	2.0	1.8-2.1	1.0	0.9-1.1
Mixed	1.7	1.6-1.7	1.4	1.4-1.5

All analyses adjusted for year of birth; Model I included gender and ethnicity; Model II included gender, ethnicity, SES, receiving social welfare 1990, single adult household 1990, housing, and residency.

The multivariate analysis of age at immigration to Sweden and hospital admission because of SII revealed that those who settled in Sweden at an age of 07 years had higher odds than those immigrants who were born here (HR 1.2, 95% CI 1.1–1.4). However, this relationship did not remain significant once the socioeconomic variables were jointly accounted for (HR 1.0, 95% CI 0.8–1.1).

5.2 Study II

A total of 4798 individuals were hospitalized for SII at least once during the study period. The majority (81 %) had been categorized as intentional and the remaining 19% as events of undetermined intent. The most frequent method of injury was poisoning, 86% of the cases categorized as *intentional injury* and 69% of the cases categorized as *event of undetermined intent*.

The admission rates due to SII increased gradually with decreasing grade point average, 0.5% at the highest level and 2.4% at the lowest level. In all levels of grade point average, crude rates of hospital admission due to SII were two to three times as large for women as for men.

Cox regression model of grade point average and hospital admission due to SII, adjusted for year of birth and gender only, revealed that the risk of hospital admission because of SII increased steeply in a stepwise manner with decreasing GPA (HRs ranged between 1.4 ,95% CI 1.3-1.6 and 6.2, 95% CI 5.5-7.0).

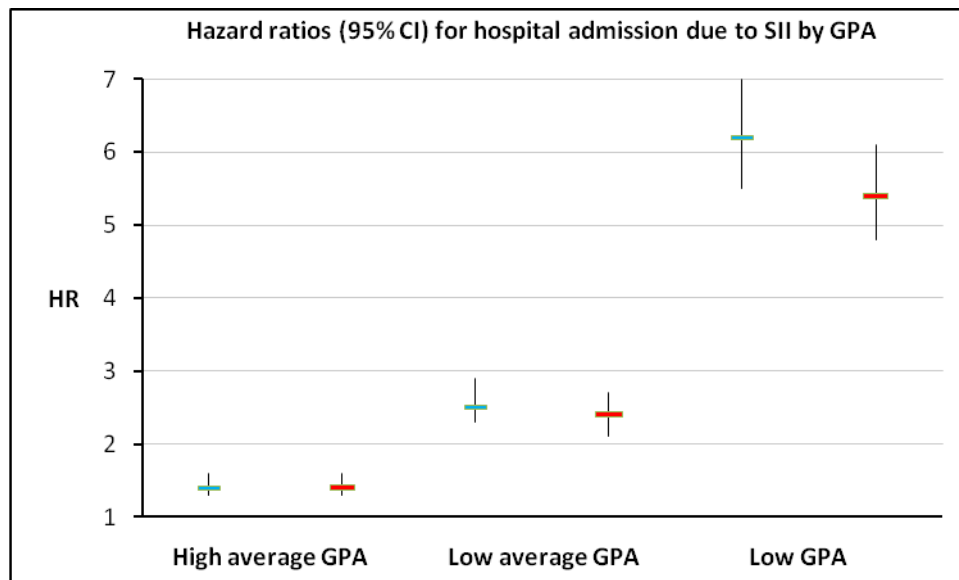


Figure 4. Hazard ratios (95% CI) for hospital admission due to SII by GPA

Blue markers=adjusted for year of birth and gender

Red markers=adjusted for year of birth, gender, ethnicity, SES, maternal education, single parent household, housing, and residency.

Reference category-High GPA=($>M+1SD$); HR=1

High average GPA=(from M to $+1SD$), Low average GPA=(from $-1SD$ to $<M$), Low GPA=($<M-1SD$)

The risks were similar for women and men. Adjustment for potential socioeconomic confounders only marginally attenuated this strong gradient (HRs ranged between 1.4, 95% CI 1.3-1.6 and 5.4, 95% CI 4.8-6.1). The gradient was similar in all studied school subjects. The HRs were highest for low grades in natural science subjects, followed by low grades in art related subjects.

5.3 Study III

The Cox regression models of the mediation analysis of parental SES and hospital admission due to SII revealed that the risk of SII increased with decreasing level of parental SES. An adjustment also for grade point average erased this increased risk. The pattern of results was similar for men and women. The results from the Sobel's test confirmed that school performance significantly mediated the association between parental SES and risk of SII ($z = -38.9$, $p < .0001$), accounting for 60% of the explained variance.

No significant interactions were found between the level of parental SES and school performance with respect to the effect of these variables on risk of SII.

5.4 Study IV

The empty model with no predictors indicates that the risk of SII varies significantly between schools ($p < 0.001$) with a variance of 0.061, a Variance Partition Coefficient of 0.0007 and Median Odds Ratio of 1.26.

The inclusion of individual level predictors (year of birth, gender, ethnicity, parental SES, maternal education, single parent household, and geographical location of the school attended), reduced the between school-level variance by 40% but significant variation in SII between schools still remained.

The school-level model for SII revealed that, regardless of their individual social characteristics, students who attend schools with a high proportion of pupils with lower parental SES and single parent households were more likely to self-injure themselves than those who attend schools with a lower proportion of such students. The higher the grade point average of the school attended, the risk of SII appeared to be increased ($OR = 1.39$).

A significant interaction between school region and individual grade point average as well as between school region and school-level grade point average was also found. These results indicated that the higher the individual grade point average and the lower the urbanization level of the school region the lower was the risk of SII, whereas the opposite appeared to be true for the school-level grade point average. With the addition of the school level variables, the variance between schools was further reduced but remained significantly different from zero.

These interactions were further examined by regressing SII on student and school GPA within each school region. The empty models for all three school regions revealed that, in the absence of any predictor variables, variation in the risk of SII differed significantly between schools. The amount of clustering of SII within schools appeared to be higher in big cities than in smaller cities and rural regions. With the inclusion of explanatory variables, however, the between-school variance in SII decreased to an insignificant level in all of the three studied regions.

Higher school-level grade point average was associated with a higher risk of SII only in rural regions.

We also found a significant cross-level interaction between individual- and school-level grade point average in big city schools indicating that the reverse association between high individual-level grade point average and SII is more pronounced in schools where the grade point average is relatively high.

6. Discussion of major findings

6.1 General discussion

The aim of this thesis was to contribute to the knowledge about social patterning of SII in youth, by ethnicity, socioeconomic conditions and school performance. The overall results suggest that the mental health of young people in Sweden, measured as SII, is closely tied to the social conditions in which they develop.

School performance in compulsory school clearly emerged as an important independent predictor of SII. The association was graded, so that each change in the level of school performance was associated with a change in the risk of SII, and gender independent. School performance appeared not only as an independent predictor of SII but also as a mediator between parental SES and SII and accounted for as much as 60% of the variance. In addition, the negative link between individual-level performance and SII appeared to be strengthened by high overall performance of the school. This result, however, applies only to schools located in big cities. Attending high performing schools located in rural areas, on the other hand, increased the risk of SII.

Ethnic minorities in Sweden (except those from Southern Europe) had an increased risk of SII as compared with the native population. When socioeconomic conditions were also adjusted for, however, the risks decreased for all ethnic minorities, but remained significantly higher for immigrants from Finland, Western Europe/other Western countries and those in the mixed group. This indicates that socioeconomic disadvantage is the main explanation for the increased risk of SII in minority youth in Sweden. A similar conclusion has been reached previously with regard to other health outcomes (Hjern, 2004; Syed et al. 2006; Tinghög et al. 2007).

Nevertheless, when investigated simultaneously with school performance, socioeconomic disadvantage, measured as parental SES, was no longer predictive of SII. The mediation analyses revealed, however, that parental SES, school performance and SII are closely intervened. The pathway is likely to occur through the chain of effects in which the effect of parental SES operates by means of its influence on school performance, which in turn predicts the risk of SII. As predictor of school performance, parental SES may constitute a crucial element that *sets the scene for more proximal risk* (Poulton & Caspi, 2005) – school performance - and thus contributes to a more comprehensive understanding of how health is patterned over the life course.

We have found little support for the hypothesis that school contextual characteristics included in this work exert an effect on risk of SII above and beyond the compositional ones. Less than 1% of the variation in SII was explained by school level factors indicating that risk of SII is most likely attributable to individual-level predictors. Notwithstanding the low between-school level variance, individuals who attended schools characterized by a higher proportion of students with low parental SES and single-parent households had a small, but statistically significant excess risk of SII, above and beyond individual background.

6.2 School performance and risk of SII – possible pathways

School performance, measured as grade point average, most probably captures both cognitive and non-cognitive abilities by which mental health is influenced. By enhancing cognitive abilities such as critical thinking and problem solving, school performance may also influence mental health directly. These are useful not only within the confines of the classroom but apply to situations outside the realm of the school and result in *real-world* benefits including better health (Der et al., 2009).

Secondly, school performance may be an important path because it is highly determinative of other exposures related to mental health. Early school performance clearly contributes to educational attainment and occupational opportunities later in life that may be one route to mental health outcomes. School performance may relate to health, not only as predictor of materialistic and occupational returns but also as an important source for identity formation and development of social roles (Baumeister et al., 2003) that have lasting impact on later mental health. Early school experiences and achievements are particularly powerful in shaping a child's self-perception as a learner that, over time, may extend beyond the academic domain and influence the more general conceptions of self-worth, self-respect, self-confidence, competence and control. Together, these self-concepts play a decisive role in forming one's identity and aspirations, and point the direction of the later occupational and health life course (Lee et al., 2006). Positive self-concepts promote positive health behaviours, protect mental health and help individuals to manage challenging life events (Hammond, 2004).

School performance serves not only as an important basis for the internal evaluation of self-worth but also as a source for how peers rate each other's worth in the school's social hierarchy (Jules, 1991; Modin et al., in press). Children's own status

among peers has been shown to be a superior predictor of health compared to the status of origin (Modin et al., in press).

6.2.1 Causality

Despite the prospective design, firm conclusions about causal associations between school performance and SII cannot be drawn. Although school performance was measured prior to the studied health outcome, which strengthens the criteria for causality, we were not able to fully account for the mental health during the school time. We excluded individuals who had been admitted to a hospital due to psychiatric disorder and/or SII before finishing ninth grade, but this may not be sufficient to rule out the possibility that there was also an effect of mental health on school performance. It is also plausible that the association observed to a certain extent is explained by shared risk factors that influence school performance as well as the risk of SII. For instance, psychiatric conditions, such as anxiety disorder (Van Ameringen et al., 2003) and AD/HD Combined Type (Murphy et al., 2002), socially deviant behaviors (Beautrais et al., 1996) and low cognitive competence (Jiang et al., 1999) are associated with both phenomena. The register design of this study did not allow for control of these conditions since these usually do not lead to inpatient care which means that such symptoms cannot be identified in a valid way in available national registers.

Strong and gradient association between school performance and SII and the homogenous pattern of associations for all school subjects and gender, give some evidence of the causal impact of poor school performance on the outcome in question.

6.3 Parental SES and SII – an indirect association

Parental SES was only indirectly related with SII through school performance. However, although not directly involved, we suggest its role in the outcome should not be disregarded. Parental SES can be seen as a distal factor that has an important influence on the proximal risk, i.e. school performance. The gradient association between parental SES and school performance suggests that parental SES may not only increase the likelihood of the proximal risk factor to occur but it may also determine its level. Poor school performance of children with low SES of origin may be seen as a prolongation of the disadvantage experienced by one generation in the lives of the next and different mechanisms induced from conception onwards may be involved in impeding an underprivileged child's ability to reach his or her academic potential.

There are several channels through which parental SES impacts on child academic outcomes. To begin with, low parental SES is associated with several conditions that may adversely influence children's cognitive development and consequently pose significant risk for poor performance in school. For example, recent studies suggest that low SES increases the risk of exposure to adverse circumstances surrounding gestation and birth (e.g. inadequate nutrition, toxic exposure and stress) (Dawson et al., 2000). These conditions can negatively influence brain development (Hackman & Farah, 2009) and its cognitive functioning in several ways (Hack et al., 1991). Low parental SES is likely to be accompanied by financial strain and psychosocial adversity related to poor parental health, alcohol misuse, and family disruption (Power & Matthews, 1997). These circumstances can undermine the amount and quality of stimulation that the child receives at home necessary for his/her optimal cognitive development (Stein et al., 2008).

The disparity in school performance between children from low and high SES can be dependent upon other factors than differences in cognitive competence. Low-SES children are less likely to receive qualified help with homework and early training in behaviors and skills (e.g. literacy) that are valued by school (Guo & Harris, 2000). In a Swedish study the proportion of children who read books every day or several times a week was 51% in the highest SES group compared to 40% in the lowest SES group. A similar trend was observed for the proportion of children who receive help with their homework. In the highest SES group 75% and 72% were helped by the mother or by the father respectively, compared to 59% and 47% in the lowest SES group (Jonsson, 2001). These differences make low-SES children less familiar with school culture, values and expectations and therefore worse equipped to achieve educational goals.

Academic success is closely related to parental encouragement that the child can succeed and to the child's motivation to achieve the expected outcomes. Children of low SES parents are less likely to possess these resources than comparisons (Werfhorst & Hofstede, 2007). Better educated parents are also more informed regarding strategic educational choices and better equipped to communicate with teachers (Power & Matthews, 1997; Jonsson, 2001; Due et al., 2003). These characteristics allow the parent to closely monitor the child's performance and be proactive in preventing academic failure.

Whether or not the social inequalities in academic outcomes tend to persist, increase or decrease, as children move through school, not only depend on

socioeconomic background, but also on the characteristics of the attending school itself. Low SES children more often attend schools that have higher percentages of disadvantaged and low-achieving students (Statistics Sweden, 2007). These school characteristics have been shown to account for some of the risk of underperformance on the individual level, over and above the effect of individual SES and cognitive abilities (Gutman & Feinstein, 2008).

Some previous research has found that children from lower SES may be at higher risk of negative experiences at school, outside the realm of academic achievements. There is evidence that social issues in school and classroom (e.g. bullying, lack of peer support, being less liked by the teachers and peers) are more frequently experienced by low SES students (Wolke et al, 2001; Nordhagen et al., 2005) and that these may be a part of academic failure (Spriggs et al., 2007).

6.4 Gender, school performance and risk of SII

The association between school performance and SII was equally strong for men and women. This finding is interesting in the light of evidence that females are more at risk of SII and tend to be more concerned about low grades than males (Steinmayr & Spinath, 2008; Freudenthaler et al., 2008). A Swedish study conducted in the county of Västernorrland, revealed that not being satisfied with school achievements is a much stronger predictor of SII in girls than in boys (Landstedt & Gillander Gådin, 2011). However, this study had a cross-sectional design and was restricted to one geographic area indicating that the findings of that study may not be comparable to our findings.

Studies focusing on depression found that the effect of school performance was moderated by gender. In a Norwegian study on 12 to 15-year-old adolescents, a baseline examination of the association between school grades and depression revealed a negative correlation between the both phenomena but only in boys, whereas at 1 year follow-up this negative link was seen only in girls (Undheim & Sund, 2005). Lehtinen et al. (2006) have found school performance to be a predictor of depressive symptoms in adulthood in women only.

The evidence that school performance seems to be an equally strong predictor of SII for males and females again highlights the significant role it plays in SII. However, whether the mechanisms explaining the link between school performance and SII are gender independent or gender specific remains to be investigated in future studies. One may speculate that depressive reactions related to

school failure may be the link between grades and SII in girls, whereas impulsive behavior, more typical in boys (Baron-Cohen, 2003), may underlie the association in males. The latter hypothesis gets some support from the observations that impulsivity co-occurs with low grades and is predictive of SII in boys (Murphy et al., 2002; Plattner et al., 2007).

Women had a higher risk of SII than men even after an adjustment for socioeconomic factors and school performance. Residual confounding by other risk factors not considered in our analysis, e.g. exposure to sexual abuse (Danielsson et al., 2009), cannot be eliminated.

6.5 Ethnicity, socioeconomic conditions and SII

Our results indicate that ethnic differences in socioeconomic conditions play an important role in explaining ethnic variations in risk of self-inflicted injury. When ethnicity and socioeconomic conditions are considered simultaneously, it also becomes evident that socioeconomic variations are larger than ethnical ones.

The risk of SII in ethnic minorities from Finland, other Western European countries and those in the mixed group was attenuated but not abolished by adjustment for socioeconomic conditions. Neither school performance seems to be a sufficient explanation, considering the analyses presented in study IV. This suggests that there are factors operating beyond socioeconomic circumstances and school achievements that influence the risk. Several explanations may have been offered to account for these residual effects. For example, SII in these groups may have been influenced by patterns of SII in the parental country of origin. A number of studies have documented high rates of SII behavior in Finland and other Western European countries as well as high suicide mortality among Finns (Schmidtke et al. 1996; Chishti et al. 2003; Mäkinen & Wasserman, 2003). The high rate of alcohol abuse, a well-known risk factor for SII (Deykin & Buka, 1994; Beautrais et al. 1996), described in immigrants from Finland as well as in the Finnish population in Finland (Hallberg & Mattsson, 1991; Hjern & Allebeck, 2003), may be an important mediator of this higher risk.

Interestingly, also minorities of mixed ethnicity remained at the higher risk of SII that was not explained by socioeconomic conditions and school performance. Since we treated all individuals of mixed ethnicity as one category we are not able to conclude whether this finding applies to all youth of mixed ancestry, e.g. due to feelings of ambiguity over one's own ethnic identity. Alternatively, judged

from the crude prevalence rates of SII, it is possible that certain mixed ethnicity populations might be more at risk of this negative outcome than others.

6.6 Contextual effect of school on risk of SII

The risk of SII in our study was only minimally influenced by school variables. Of the five school level factors we investigated, a higher concentration of students from single-parent households was seen to be the most *robust* predictor of SII, remaining significant in models adjusted for both individual-level family background and other covariates. This finding is in accordance with the results from another Swedish study, where social fragmentation at the school level, partly defined as proportion of children raised in single-parent household, has been found as the most important predictor of psychosis (Zammit et al., 2010) as well as with earlier publications focusing on neighborhoods (Boyle & Lipman, 1998; Wade et al., 1999).

Collective socialization perspective, which refers to the influence that adults in various social contexts have on youth, may be one mechanism explaining the association. Single parents are more likely to experience economic hardship, role overload, social isolation, and mental health problems (Ringbäck Weitoft, 2003), with the result that they have less time and energy for supervising children and being involved in their school and social life than parents in two-parent families. Thus, concentration of single parents within the neighborhood may correlate with lower level of community involvement and supervision of youth. Under such circumstances, children's well-being may be less closely monitored and, if required, addressed by adults, while, as the contagion model predicts, it may be increasingly influenced by the behavior, values and expectations of peers.

The negative association between school performance and risk of SII seen at the individual level has not been observed at the school level. For rural schools only, the opposite association seems to be the case, suggesting that attending high performing schools located in rural areas increases the risk of SII. Two earlier studies, though not limited to the rural areas, have shown similar results (Karvonen et al., 2005; Saab & Klinger, 2010). This finding seems to be in accord with the theoretical explanation provided by social comparison theory (Festinger, 1954). The argument here is that comparing oneself to others serves as a means of self-evaluation. The larger the proportion of high performing peers the more negative one's self view (Zeidner & Schleyer, 1999). The large scale PISA study demonstrated that in 24 of 26 counties included, academic self-concept was negatively correlated with the school-average

achievement (Marsh & Hau 2003). Negative self-concepts, whether related to the academic domain or not, lead to poor mental health, including SII (Lee et al., 2006). However, the reason why the positive relationship between school average performance and SII only emerged for rural schools is not possible to conclude from our data.

6.6.1 Intra-class correlation in multilevel logistic regression – VPC and MOR

Variance partition coefficient measures the proportion of variance in the outcome that is accounted for by the group level (Raudenbush & Bryk 2002). For the linear model the VPC (or ICC) is calculated as a ratio of between-group variance to total variance:

$$VPC = V_{2nd\ level} / (V_{2nd\ level} + V_{1st\ level})$$

A high VPC suggests that the assumption of independence is violated, i.e. that there is a high between-group variation relative to the within-group variability.

Contrary to the linear model, in the multilevel logistic model both the individual level and the group level variances are not expressed on the same scale and the calculation of ICC for dichotomous outcomes is not straightforward. To resolve this problem, alternative methods, that convert the individual level and area level components of the variance to the same scale, have been developed (Merlo et al., 2006).

Two different methods for computing intra-class correlation were used in our study, the simulation method and the Median Odds Ratio. The simulation method translates the group level variance from the logistic to the probability scale. When both the group level and the individual level variance are expressed on the same scales the intra-class correlation may be computed as for linear model (Goldstein et al., 2002).

The simulation method revealed that less than 1% of the total variation of SII between schools was accounted for by the particular school attended suggesting that schools are very similar with respect to the prevalence of SII. This very low figure may partly be due to the character of the outcome variable. SII is a relatively rarely prevalent phenomenon which affects the individual level variance (Larsen & Merlo, 2005). Calculation of ICC for rarely (or highly) prevalent outcomes results in lower ICCs than for outcomes that show a wider disparity in prevalence, despite a similar group level variance.

The other method we used was Median Odds Ratio (MOR). The MOR method translates the area level variance in an odds ratio scale. In contrast to the

simulation model, the MOR is statistically independent of the outcome prevalence (Merlo et al., 2006). Using the information provided by the MOR as a measure of school variance, we found that, when randomly selecting two students from two different schools, the OR between the student at the lowest risk and the student at the highest risk was above 1.26 in half of the cases. Thus, some level of heterogeneity in SII existed between schools.

In general, small effect sizes have been reported in virtually all studies that have investigated the effect of school on individual-level mental health (Sellström & Bremberg, 2006). Besides the relatively low prevalence of the outcome variable, other explanations might have contributed to the low between-school variance. For example, there are some suggestions that the intermediate level of nesting, i.e. classroom-level, may be a more appropriate measure of the clustering effect (Wilkinson et al., 2002; Modin & Östberg, 2009).

6.7 Strengths and limitations

The current studies utilize almost complete national birth cohorts of over 1 million men and women born between 1973-82 (Study I) and nearly 500 thousand women and men born between 1973-77 (Study II-IV) that were followed up for an average of almost 11 years. The possibility to use national data prevents sampling selection bias.

Individuals were well defined for a range of demographic and socioeconomic variables. The unique Swedish Population Registers and the Swedish Hospital Discharge Register are almost entirely complete. The use of hospitalized cases eliminated recall bias.

The information about school performance is obtained before SII and is therefore prospective. Consequently, misclassification with regard to exposure, although improbable, is independent of SII and thus non-differential.

During the period in focus, a five-graded relative scale (5 being the highest) was used in the Swedish school system. The grade scale was intended to follow a normal distribution on the national level with a mean of 3. As mentioned above, the grading system was supervised by national tests in core subjects. The quality of the data in the National School Register is high and summary statistics are published regularly (www.skolverket.se). Thus, it seems reasonable to believe that the quality of school performance data was acceptable for the research purposes.

The present study has certain limitations. Firstly, the study was based exclusively on hospital-treated cases of SII. People who visited a general practitioner or the emergency room without admittance to the hospital, or who did not seek any medical assistance were not included. The choice to include also cases with undetermined intent - with the aim of avoiding under-estimation – implies that cases actually not reflecting intentional injuries may have been included to some extent. A recent Swedish nationwide cohort study revealed that hospitalization due to injury with undetermined intent is strongly predictive of subsequent suicide in youth (Zambon et al., 2010). This gives some further support to the rationality of including also these cases in a study of SII. Secondly, it was not possible to determine whether the degree of seeking medical care when self-injured is comparable across ethnic and SES groups. If not, an underestimation or overestimation of the HRs may have occurred. Previous reports, however, have suggested that ethnic minorities in Sweden have a similar consumption of care, after adjustment for health status to that of the majority population (Hjern et al. 2001).

Socioeconomic variables were measured at one point and thus conceptualized as static. It is increasingly recognized that fluctuations in socioeconomic circumstances can have important effects on children's development (McLeod & Shanahan, 1993; Bradbury, Jenkins, & Micklewright, 2001). The variable ethnicity in Study I, although in comparison with many previous studies sub-grouped in relative detail, still constitutes a very general concept, neglecting the rich diversity of different cultures included within each subgroup.

We may not exclude that our findings on the association between school performance and SII was confounded by genetic factors. It is possible that common genetic factors could predispose to both academic outcome and the risk of SII. To uncover genetic influences the twin study design is required.

We have no possibility to investigate the mobility of students between schools in study IV. If the individuals moved between schools with different characteristics during the schooling years then a single measure in ninth grade may not be able to appropriately capture the school-levels exposure. Thus, high mobility may result in an underestimation of the between-school variance.

7 Conclusions and implications

If medical researchers were to discover an elixir that could increase life expectancy, reduce the burden of illness, delay the consequences of aging, decrease risky health behavior and shrink disparities in health, we would celebrate such a remarkable discovery. Robust epidemiological evidence suggests that education is such an elixir

Freudenberg & Ruglis, 2007, p.1

The main conclusions and implications may be summarized as follows:

- School performance is a strong predictor of future mental ill-health as expressed by SII. The gradient association between school performance and SII was similar in all school subjects, in men and women, and only marginally attenuated when multiple socioeconomic confounders were adjusted for. Poor school performance should be considered as a warning sign for increased risk of SII among young people.
- School performance is an important mediator through which low parental SES translates into risk of SII. This suggests that school interventions adequately meeting the academic needs of children from low socioeconomic background may, in addition to the end in itself, have the potential to counterbalance the negative health pathway caused by socioeconomic disadvantage. Educational strategies directed toward low-SES students' academic outcomes should be accompanied by the social ones, aiming to reduce socioeconomic differences in psychosocial and environmental factors implicated in the academic success. This is especially important in light of the growing social inequality in school performance in Sweden (OECD, 2010b).
- Correlation between parental SES and children's school performance means that inequality is transmitted from one generation to the next. Investments in children's education hold the promise of promoting intergenerational mobility and, in consequence, breaking the cycle of intergenerational disadvantage.

- The increased risk for SII among youth in non-Western ethnic minorities in Sweden seems to be explained mainly by socioeconomic factors. Reducing socioeconomic inequalities in the Swedish society seems to be an important strategy to prevent SII in these populations. However, the time since migration has to be taken into consideration because the first time in a new country is usually accompanied by an unfavorable social situation.
- The increased risk of SII in some ethnic minorities that was not accounted for by socioeconomic conditions, and apparently not by school performance, indicates the importance of paying attention to unique patterns to injury risk that may exist among ethnic groups.
- School-level factors explain only a small percentage of student's risk of SII, indicating that the differences in SII mainly seem to be due to individual characteristics. This might suggest that the most effective strategy to reduce the prevalence of SII would be to focus on individual-level interventions. We formulate this conclusion with caution, however, because it is plausible that this finding may not generalize to other mental health outcomes.
- Concentration of children from disadvantaged backgrounds in schools appears to negatively affect mental health, regardless of whether or not they are exposed to such problems themselves. Thus, reducing social segregation between schools is likely to reduce the average student risk of SII. Investments into improvements in educational outcomes of the disadvantaged schools may be an alternative way to reduce the socioeconomic segregation between schools.

8 Future studies

It is essential that future research tries to effectively disentangle the effect of school performance from the effects of other factors that may underlie the association between school grades and SII, such as mental health problems not captured in the registers. Another question for future studies will be to test and explicitly define the mechanisms that make school performance such a powerful predictor of SII and to verify whether these mechanisms act uniformly across various social strata.

Research based on register data on hospital discharge is restricted to the medical diagnoses made by the responsible physician at discharge and does not include any psychological or subjective information. Studies based on other data sources, e.g.

questionnaires, have shown that, for example, experiences of abuse, poor relationships with parents or friends, and minority sexual orientation may put young people at risk of SII (Ewans et al., 2004). Thus, it would be of interest for future studies to consider the role of school performance on SII in the context of these circumstances.

Finally, the measures of school effects were restricted to the socioeconomic and academic characteristics. Inclusion of other dimensions of school context, e.g. teacher support, would perhaps result in a more comprehensive model of school effect on mental health.

9 Summary in Swedish

Bakgrund: I Sverige har antalet unga människor (15-24 år gamla) som tagits in på sjukhus p.g.a. avsiktligt självförovållade skador ökat markant de senaste 10 åren. De bakomliggande orsakerna är ofta både psykologiska och sociala. Effekten av de sociala faktorerna har undersökts i mindre utsträckning. Forskning tyder på att risken för självskadebeteende inte är jämnt fördelad över olika samhällsskikt. Den allmänna bilden är att ungdomar med en annan etnisk bakgrund än svensk och de som växer upp i socioekonomiskt utsatta familjer kan vara särskilt riskutsatta. Dessutom ökar empiriskt stöd för att skolprestationernas kvalitet har ett viktigt inflytande i sammanhanget.

Syfte: Det övergripande syftet är att öka kunskapen om den roll som etnicitet, familjens socioekonomiska bakgrund och skolprestationer, på såväl individnivå som skolviv, kan ha för risken för självskadebeteende bland ungdomar och unga vuxna. Studien avsåg att besvara följande frågeställningar: 1) Skiljer sig prevalensen av självskadebeteenden mellan ungdomar med svensk och annan etnicitet och i vilken utsträckning kan den eventuella skillnaden förklaras av familjens socioekonomiska bakgrund? 2) Kan skolprestationer, definierade som medelbetyg vid utgången av grundskolan, predicera risk för självskada senare i livet? 3) Kan familjens socioekonomiska status antas medföra en risk för självskadebeteende bland ungdomar och kan det eventuella sambandet medieras och/eller modifieras av skolprestationer? 4) Hur mycket av variationen i risken för självskadebeteende är individuellt betingad och hur mycket handlar om skillnader mellan skolor? Kan nivå på en skolas akademiska och socioekonomiska ställning ha en självständig effekt på risken för självskadebeteende hos sina elever, oberoende av effekterna av de individrelaterade omständigheterna?

Metod: Underlaget för denna studie utgörs av registerbaserad statistik avseende: självskadebeteende, familjens socioekonomiska bakgrund och skolprestationer. Den studerade populationen består av hela den del av Sveriges befolkning, som är född mellan 1973 och 1982 (N=1 009 157) och 1973 och 1977 (N=491 258) och som dokumenterats i den Svenska Folk- och bostadsräkningen 1985 och 1990. Ungdomar med genomförd självskada identifierades via Patientregistret. Information om ursprungsland för de studerade ungdomarna och deras föräldrar har hämtats från Befolkningsregistret 1990. Uppgifter om familjens socioekonomiska status (SES) har inhämtats från Folk- och bostadsräkningen 1985 och 1990. Uppgifter som

skolprestationer (genomsnittsbetyg i årskurs 9 och slutbetygen i en rad specifika ämnen) har inhämtats från Skolregistret.

Resultat: Etniska minoriteter i Sverige (utom de från södra Europa) hade en ökad risk för självskadebeteende jämfört med infödda befolkningen (Hazard Ratios varierade mellan 1.6 till 2.3). När familjens socioekonomiska bakgrund kontrollerades, minskade risken för alla etniska minoriteter, men den förblev högre för invandrare från Finland, Västeuropa/andra västländer och de med en svenskfödd och en utlandsfödd förälder. Skolprestationer i grundskolan har framkommit som en stark, oberoende prediktor för självskadebeteende (Hazard Ratios varierade mellan 1.4 (för GPA= M+1SD) och 6.2 för GPA=($<M-1SD$)). Skolprestationer verkade inte bara som en oberoende prediktor för självskada utan också som en mediator i sambandet mellan föräldrars SES och risken för självskada, och stod för så mycket som 60% av variansen. Risken för självskadebeteende varierade signifikant mellan skolor. Individer i skolor där en stor andel elever har ensamstående föräldrar och/eller sådana med låg SES har en liten men statistiskt signifikant ökad risk för självskador, oberoende av individuell bakgrund. Men då mindre än en procent av variansen mellan skolor förklarades av kontextuella faktorer, pekade faktorer på den individuella nivån ut som främsta orsak till riskskillnaden.

Slutsatser: Den ökade risken för självskadebeteende bland ungdomar med utom-europeisk etnicitet i Sverige tycks kunna förklaras främst av socioekonomiska faktorer. Dåliga skolprestationer kan inte bara vara för självskadebeteende, de kan även vara en viktig väg för att föräldrars låga SES skall kunna leda till sådana. Svaga skolresultat bör ses som ett tecken, som varnar om ökad risk för självskador bland unga. Skolnivåns faktorer förklarar bara en liten procentdel av risken för sådant beteende bland eleverna, vilket tyder på att skillnaderna när det gäller självskadebeteende främst tycks bero på individuella faktorer.

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